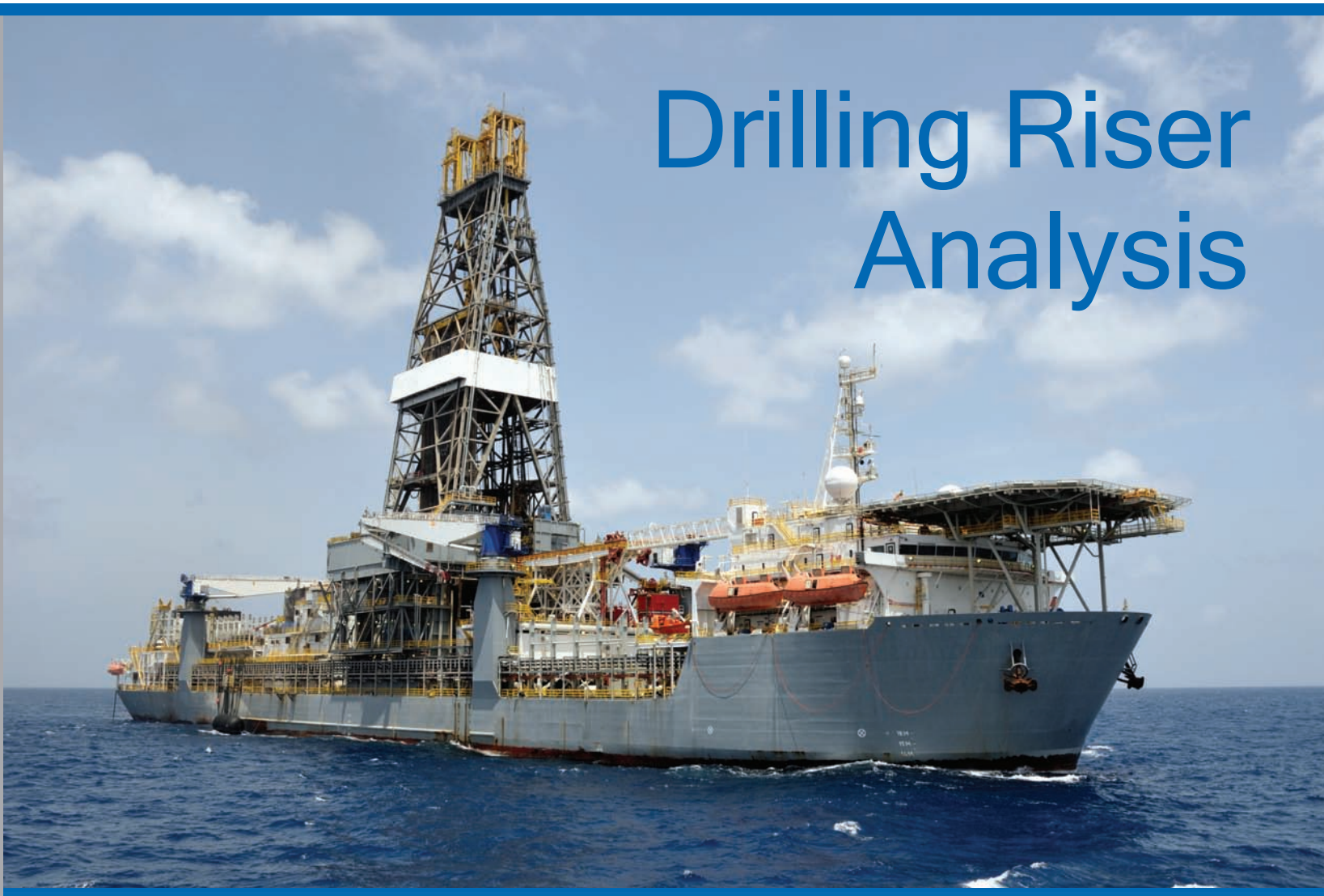
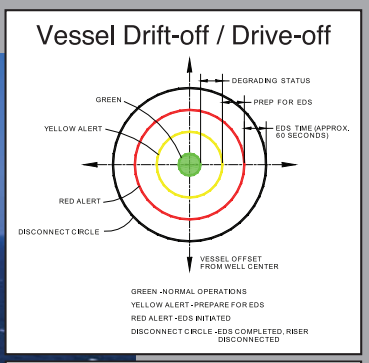
STRESS ENGINEERING SERVICES INC.
an employee-owned company

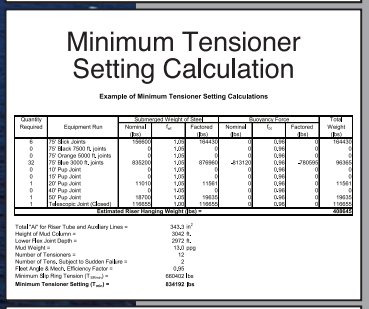
Upstream: Oil & Gas

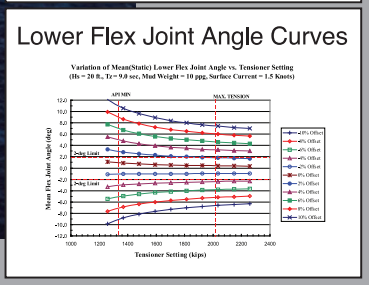
Drilling Riser Analysis



The process of offshore drilling creates increasing new challenges as the industry continues to explore in water depths beyond 10,000 feet. As pioneers in this area, we offer a comprehensive list of analysis services that include powerful proprietary tools and techniques available nowhere else. Whether you need expert advice on dynamic positioning, analysis of a drilling riser disconnect scenario, or conversion of an existing MODU for operation in deeper water, Stress Engineering Services is ready to tackle your problem.







RISER/RIG CAPABILITY ANALYSIS AND CONFIGURATION OPTIMIZATION

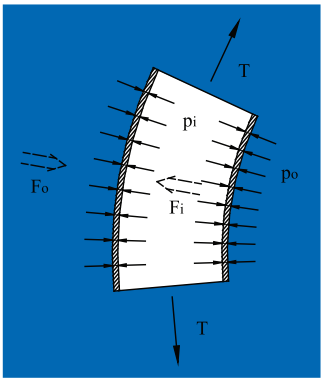
Stress Engineering can determine a riser and/or rig system's capabilities and operating limits at various water depths, mud weights and in different environments. The resulting information is useful in decision making on new-builds, upgrades and the purchases of existing rigs. Riser configuration optimization, tube wall thickness optimizations, and buoyancy effectiveness evaluation are especially useful for new purchase decisions. Stress Engineering can also provide 3rd party verification of riser and/or tensioner manufacturer operational specifications.

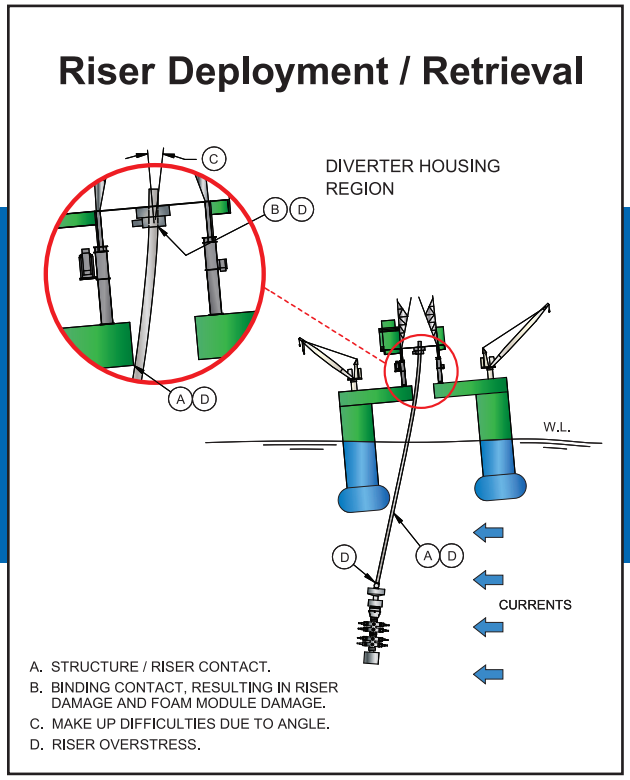
COMPONENT/TENSIONER SELECTION AND OPTIMIZATION VIA PERFORMANCE ANALYSIS

Stress Engineering routinely analyzes the global performance of drilling risers to optimize the use of components such as flex joints, gas handlers or surface BOPs, telescopic joints, keel joints, fill valves, and suspension joints for storm hangoff or transit. Similar analytical approaches can be used to optimize tensioner systems for new-builds and upgrades.

RISER TENSIONER SYSTEM RECOIL ANALYSIS

Our proprietary STARR software gives us unmatched capabilities in simulating the recoil that occurs after an emergency disconnect. With STARR we can determine operating limits such as heave, tension, and stroke imposed by riser recoil requirements. We can also analyze rig-specific tensioner configurations, recoil control systems, riser stack-up, tension settings, mud weight, heave, and stroke to limit impact force, avoid rope slack, and lift the LMRP clear of the lower BOP stack.





DRIFT-OFF / DRIVE-OFF ANALYSIS FOLLOWING EMERGENCY DISCONNECT

Stress Engineering can determine maximum loads and stresses on riser and rig as it is pushed by wind and/or surface current with a suspended, disconnected riser. We can also perform Time Domain Drive-off / Drift-off Analysis of vessel offset limits to establish operational green/yellow/red zones for emergency disconnect planning.

COMPLIANCE WITH API RP16Q OPERATING GUIDELINES

For site-specific riser deployments Stress Engineering can confirm operating envelopes defined by top tension, allowable rig offsets, flex joint angles, and maximum riser stresses for a given riser configuration, environment, water depth and mud weight.

RISER CONFIGURATION OPTIMIZATION

Stress Engineering can help determine the best riser assembly for a given rig, riser, mud weight, water depth, sea state, current, tensioner system, hook load limit, and riser joint inventory.

AXIAL DYNAMIC BEHAVIOR DURING DISCONNECTED STORM HANG-OFF

Using our proprietary software SPECVIB, Stress Engineering can optimize riser configuration to eliminate dangerous potential problems in both hard and soft hang-off scenarios. Results of analysis will estimate the possibility of axial compression during severe down-heaves. Analysis will also determine possible near resonance riser axial response for long suspended risers; calculate maximum bottom package vertical motion, as well as maximum heave-magnified loads and stresses in the riser assembly. In addition, Riser Collapse Analysis can determine collapse potential after sudden discharge of drilling mud, such as after an emergency disconnect.

RISER DEPLOYMENT/ RETRIEVAL ANALYSIS

Stress Engineering can establish maximum current profiles and sea states for safely running or retrieving riser, casing, or trees / manifolds, and maximum sea states for safely landing BOP. This can include analyzing the effects of drifting with surface current to achieve operational success in high current profiles.

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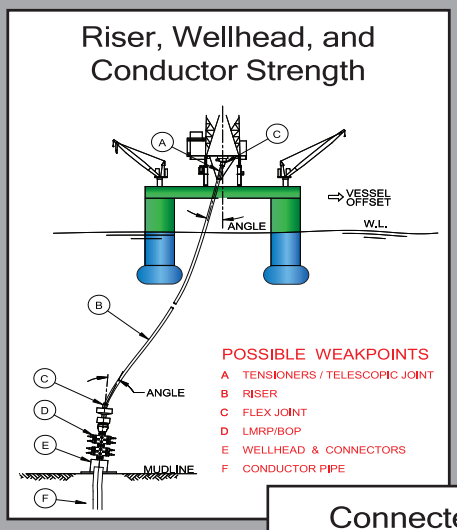

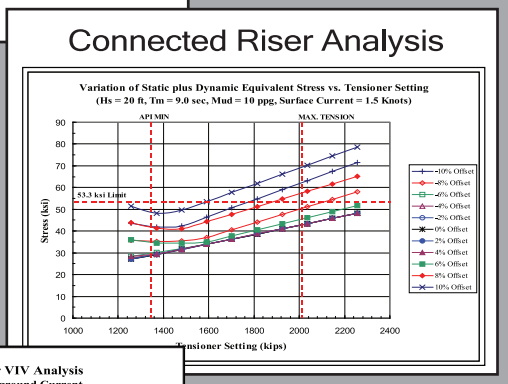

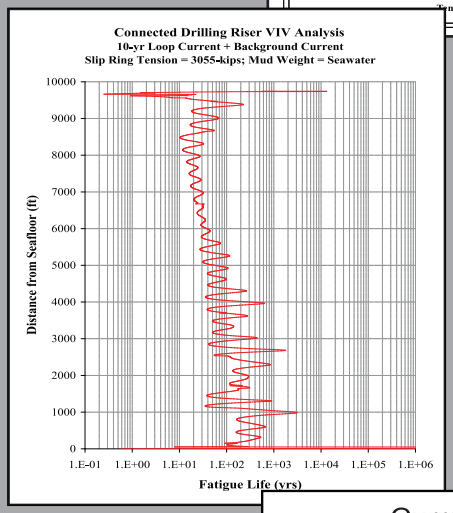

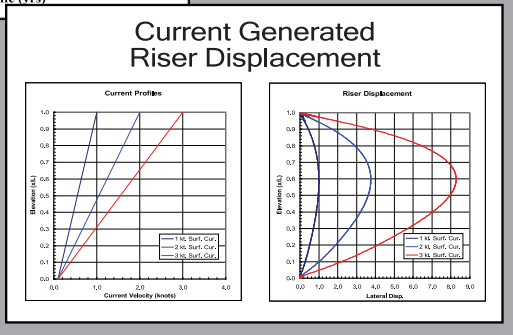

WEAK POINT ANALYSIS

Stress Engineering Services can identify the "weak link" in a riser, wellhead, or riser tensioner system when a DP vessel drifts off station, combined with failure to achieve emergency disconnect. This service includes modeling of tensioners, riser, wellhead, structural casing, and near surface soil properties.

VORTEX-INDUCED VIBRATION (VIV) ANALYSIS

Stress Engineering Services uses Shear7 software to identify potential riser and/or conductor casing fatigue problems in high currents during deployment, or while connected. We can also evaluate the effectiveness of VIV suppression devices. Going beyond RP16Q when necessary, we can develop Advanced Design and Operational Strategies that combine the results of VIV, Weak Point, Deployment, and Riser Recoil Analyses.

TRANSIT ANALYSIS WITH SUSPENDED RISER

Using DERP and RigDERP software, Stress Engineering Services can analyze possible transits between nearby well sites with riser and BOP suspended near full depth below rig, providing both feasibility assessment and maximum safe speed determination. Issues of VIV response and contact between riser and vessel are considered.